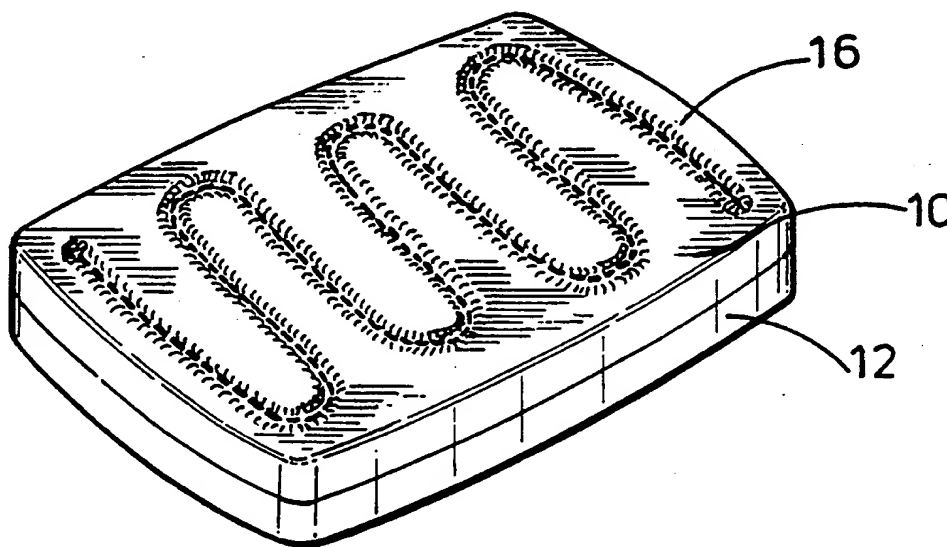




## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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<b>(21) International Application Number:</b> PCT/GB91/00773 <b>(22) International Filing Date:</b> 16 May 1991 (16.05.91)  <b>(30) Priority data:</b> 9011858.9                      26 May 1990 (26.05.90)                      GB  <b>(71) Applicant (for all designated States except US):</b> FIBRE TECHNIQUES LIMITED [GB/GB]; Unit 34, Greenfield Business Park, Greenfield, Holywell, Clwyd CH8 7HJ (GB).  <b>(72) Inventor; and</b> <b>(75) Inventor/Applicant (for US only) :</b> CARSON, John, Edward [GB/GB]; Clwyd House, 11 Bryneithin Avenue, Prestatyn, Clwyd LL19 9LS (GB).  <b>(74) Agent:</b> ROYSTONS; Tower Building, Water Street, Liverpool L3 1BA (GB).		<b>(81) Designated States:</b> AT (European patent), BE (European patent), CH (European patent), DE (European patent), DK (European patent), ES (European patent), FR (European patent), GB, GB (European patent), GR (European patent), IT (European patent), JP, KR, LU (European patent), NL (European patent), SE (European patent), US.  <b>Published</b> <i>With international search report.</i> <i>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i>

**(54) Title:** CATALYTIC CONVERTERS**(57) Abstract**

Protective material for a catalytic converter block comprises a pad of fibrous material in an envelope (10), wherein the envelope has its depth reduced in at least localised areas or positions by drawing together of opposing faces of the envelope, such as by stitching (16).

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Title: Catalytic Converters

# DESCRIPTION

This invention concerns catalytic converters principally for motor vehicles.

5 Catalytic converters are used for treatment of exhaust gases from motor vehicle engines to render them substantially harmless before emission to atmosphere. Treatment is by passing the exhaust gases through a chamber enclosing as porous ceramic block whose pores  
10 are coated with a suitable catalyst.

The ceramic block is contained in a chamber formed from two half shells welded together at their edges, the chamber having an inlet and an outlet. The block is wrapped in fibrous material in order to  
15 insulate it from colder temperatures outside the converter, to provide sound proofing and to cushion the ceramic block against expansion and contraction of the chamber.

A commonly used fibrous material is that sold  
20 under the trade name SAFFIL which is 95% alumina and provided as a low density mat. Currently two pads of fibrous material are used, one being laid in the first half shell and the other on top of the converter block when it has been laid on the first pad of fibrous

material. This method is unsatisfactory in a number of respects. Firstly, the pads do not always meet at the ends leaving unprotected areas of catalytic converter block. Secondly, the fibrous material is pre-cut and its weight adjusted to be within tolerance, but the resultant pad thickness can vary considerably even by a factor of two. That variation in thickness presents problems when putting together a catalytic converter. Proposals have been made in U.K. Patent Applications Nos. 2171180A and 2205929A for methods of wrapping ceramic blocks to facilitate fitting of same catalytic converters.

These methods have proved to be acceptable in most areas but the presence of several layers of plastics material around and between layers of the fibrous material is seen as a possible source of contamination of the fibrous material that could impair its effectiveness.

An object of this invention is to provide a way of installing fibrous material about catalytic converter blocks so that the above-mentioned disadvantages are overcome or at least mitigated.

According to the invention it is proposed that fibrous material pads for catalytic converter blocks be provided in a preferably sealed envelope.

It is further proposed that said envelope

preferably has its depth reduced in at least localised areas or positions by drawing together of opposing faces of the envelope. Said drawing together of said envelope faces may be achieved in a variety of ways.

5 For example, plastics tags such as of the type used for affixing labels to clothing and the like may be used, such tags comprising a thin flexible plastics rod with a T-bar at each end. Such tags are usually inserted by a specially designed machine. Alternatively, the opposed  
10 faces of the envelope may be stitched or tacked together either by hand or preferably by machine.

Tags or stitches may be provided at discrete locations of the envelope, in an ordered pattern or randomly. Stitching or tacking may be provided in  
15 separate lines, possibly crossing over each other, or in one continuous line or indeed in any other desirable or convenient formation, particularly from production considerations. The positioning and spacing of tags or stitches may be dependent on the size of the pad of  
20 fibrous material.

By selecting the positioning of tags, stitching or tacking and the tension thereof, the thickness of an envelope containing fibrous material may be controlled to within a desired range irrespective of the original  
25 thickness of the pad of fibrous material contained in the envelope.

The envelopes for use in the present invention are preferably made of plastics material and may be conveniently sealed by heat sealing along edges of overlapped sheets or of a folded sheet of suitable plastics material. The plastics material itself should preferably be sufficiently strong to withstand the insertion of tags or stitches, for example without tearing. In addition, the plastics material is preferably air permeable so that the pad of fibrous material can be flexed to follow the shape of a catalytic converter half shell and/or block and be compressed by said tags or stitching. Non-woven textile material made from plastics fibres, such as polypropylene fibres, may be particularly suitable for producing envelopes for the invention.

The invention will now be further described, by way of example only, with reference to the accompanying drawings, in which:-

Figure 1 shows a pad of fibrous material in an envelope;

Figure 2 shows a pad of fibrous material in an envelope with a first stitch arrangement;

Figure 3 shows a pad of fibrous material in an envelope with a second stitch arrangement;

Figure 4 shows a pad of fibrous material in an envelope with a third stitch arrangement;

Figure 5 shows a pad of fibrous material in an envelope with a tag arrangement; and

Figure 6 shows a pad of fibrous material in an envelope with a fourth stitch arrangement.

5 Referring to Figure 1 of the accompanying drawings, a pad of fibrous material, typically SAFFIL, is enclosed in an envelope 10 of non-woven textile material made from polypropylene fibres. The envelope is formed by heat sealing together edges of overlaid  
10 sheets of the textile material with the pad of SAFFIL therebetween or by heat sealing together edges of a sheet of the textile material folded about a pad of SAFFIL. The heat sealed join is indicated at 12.

Thus such enveloped pads will be used in a  
15 catalytic converter either side of a catalytic converter block for protection and sound proofing.

Turning to Figure 2 of the accompanying drawings, the enveloped pad of Figure 1 is shown treated to reduce its thickness, i.e. by drawing together the  
20 opposed larger faces of the envelope. That drawing together is achieved by means of stitching 16 through the envelope. The stitching 16 is shown as a continuous line.

The pad of Figure 2 being thinner is easier to  
25 install in a catalytic converter and there is less likelihood of edges thereof being trapped between half

shell edges to be welded together.

In Figure 3 of the accompanying drawings stitching 116 is in the form of straight lines in a crossover arrangement.

5 In Figure 4 stitching 216 is in the form of discrete parallel lines.

In Figure 5 plastics tags 316 of the type comprising a rod and T-bar ends (often used in affixing labels to clothing) are used to draw the envelope faces  
10 towards each other to compress the pad of fibrous material therein. The tags 316 are inserted using a special machine and are arranged in an orderly pattern.

Finally in Figure 6 discrete stitches 416 are used arranged randomly.



## CLAIMS

1. Protective material for a catalytic converter block comprising a pad of fibrous material in an envelope, wherein said envelope has its depth reduced in  
5 at least localised areas or positions by drawing together of opposing faces of said envelope.
2. Protective material as claimed in claim 1, wherein said opposing envelope faces are drawn together by means of tags therethrough.
- 10 3. Protective material as claimed in claim 2, wherein said tags comprise a thin rod with a T-bar at each end.
4. Protective material as claimed in claim 1, wherein said opposing envelope faces are drawn together  
15 by means of stitching.
5. Protective material as claimed in claim 2, 3 or 4, wherein said tags or said stitches are provided at discrete locations of the envelope.
6. Protective material as claimed in claim 5,  
20 wherein said tags or said stitches are arranged randomly.
7. Protective material as claimed in claim 5, wherein said tags or said stitches are arranged in an orderly pattern.
- 25 8. Protective material as claimed in claim 4,

wherein said stitching is provided in separate lines.

9. Protective material as claimed in claim 8, wherein said lines cross over each other.

10. Protective material as claimed in claim 4, wherein said stitching is provided in a continuous line.

11. Protective material as claimed in any one of claims 1 to 10, wherein the envelope is of plastics material.

12. Protective material as claimed in claim 11, wherein the envelope is sealed.

13. Protective material as claimed in claim 12, wherein the envelope is formed by heat sealing together overlapping edges of plastics sheet material.

14. Protective material as claimed in any one of claims 1 to 13, wherein the envelope is of air permeable material.

15. Protective material as claimed in claim 14, wherein the air permeable material is a non-woven textile material.

16. Protective material as claimed in claim 15, wherein the non-woven textile material of plastics fibres.

17. Protective material as claimed in claim 16, wherein said plastics fibres are of polypropylene.

18. Protective material as claimed in any one of claims 1 to 17, wherein the fibrous pad is of alumina.

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19. Protective material for a catalytic converter block substantially as hereinbefore described with reference to and as illustrated in any one of Figures 2 to 6 of the accompanying drawings.

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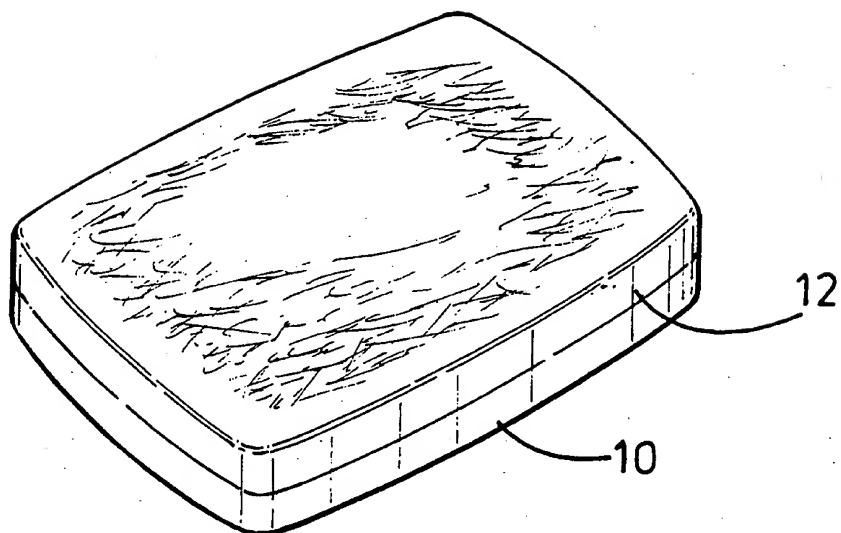


FIG. 1

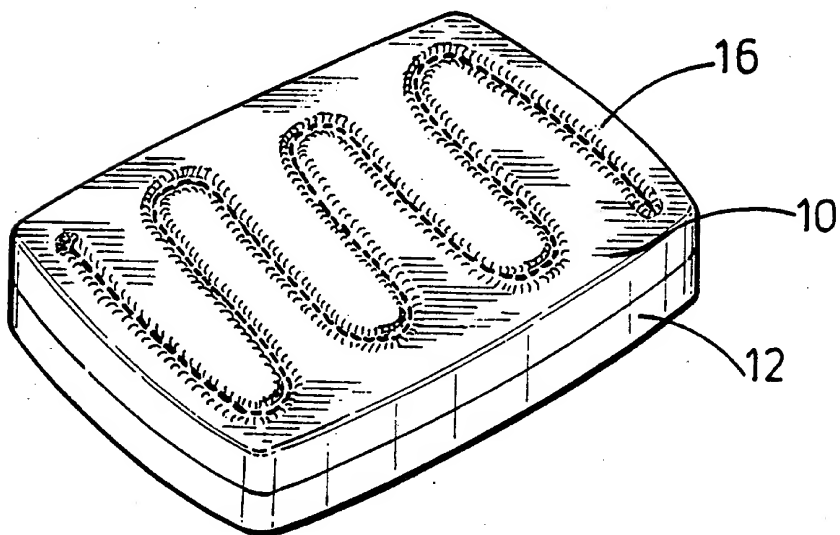


FIG. 2

**SUBSTITUTE SHEET**

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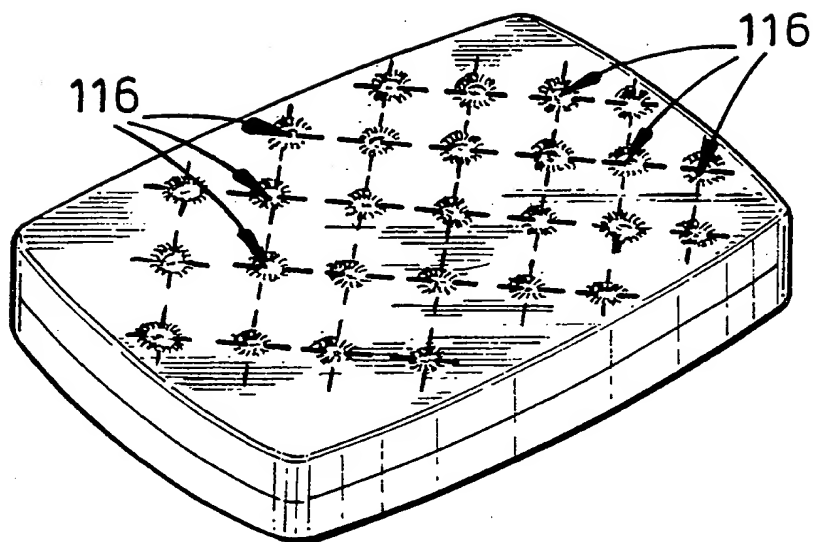


FIG. 3

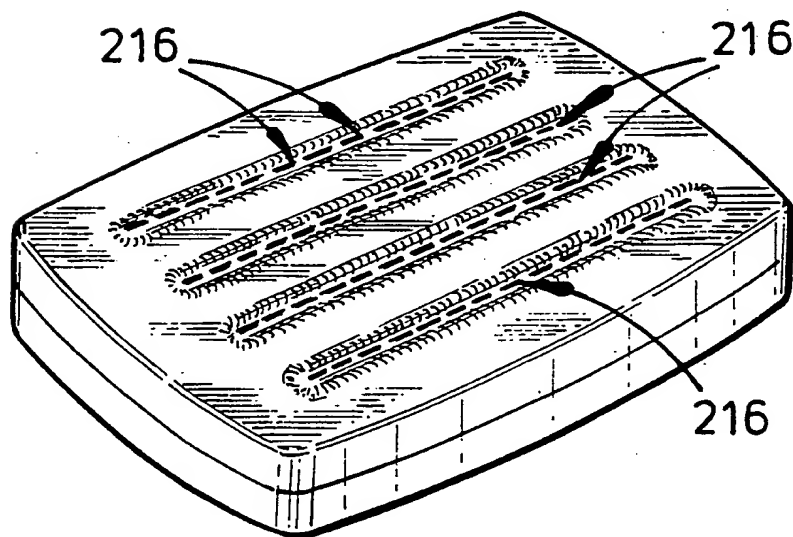


FIG. 4

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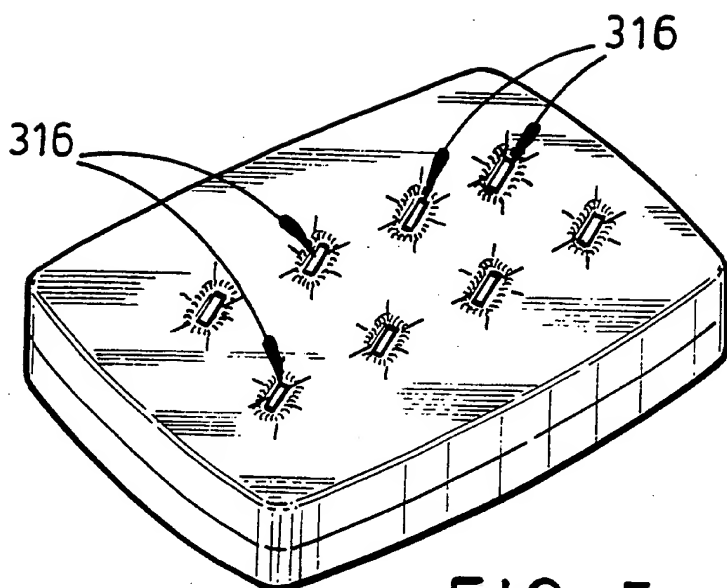


FIG. 5

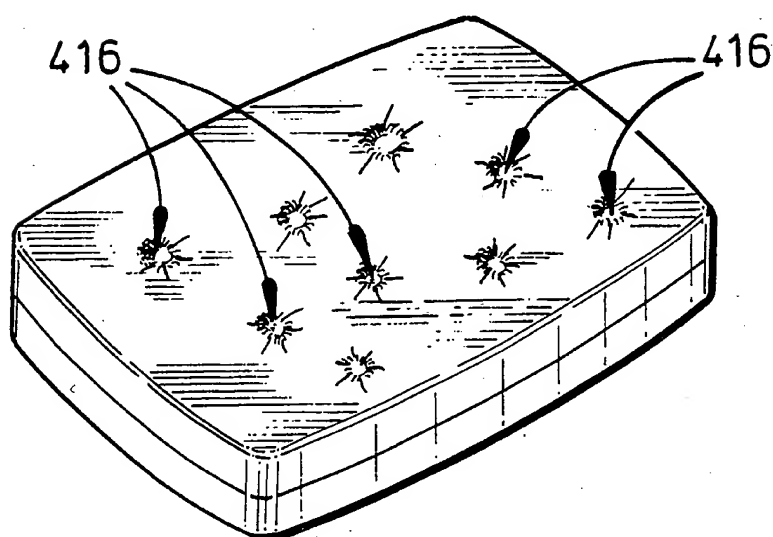


FIG. 6

SUBSTITUTE SHEET

<b>I. CLASSIFICATION OF SUBJECT MATTER</b> (if several classification symbols apply, indicate all) <sup>6</sup>		
According to International Patent Classification (IPC) or to both National Classification and IPC		
Int.Cl. 5                      F01N3/28		
<b>II. FIELDS SEARCHED</b>		
Minimum Documentation Searched <sup>7</sup>		
Classification System	Classification Symbols	
Int.Cl. 5	F01N ;              F16L	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched <sup>8</sup>		
<b>III. DOCUMENTS CONSIDERED TO BE RELEVANT<sup>9</sup></b>		
Category <sup>10</sup>	Citation of Document, <sup>11</sup> with indication, where appropriate, of the relevant passages <sup>12</sup>	Relevant to Claim No. <sup>13</sup>
X	EP,A,0 328 293 (MINNESOTA MINING AND MANUFACTURING COMPANY) August 16, 1989  see page 2, line 62 - page 3, line 51; figures 1-3  ---	1,4,5,7, 8,10,11, 18
Y	GB,A,2 171 180 (W.F.J.REFRACTORIES) August 20, 1986 cited in the application	1,4,5,7, 11-13,18
A	see the whole document ---	14-16
Y	US,A,2 520 914 (CRAWFORD) September 5, 1950  see the whole document ---	1,4,5,7, 11-13,18
A	US,A,4 144 627 (NODA) March 20, 1979 see column 2, line 52 - column 6, line 8; figures 1-6  ---  -/--	1,11-13
<div style="display: flex; justify-content: space-between;"> <div style="width: 48%;"> <p><sup>10</sup> Special categories of cited documents : <sup>10</sup></p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> </div> <div style="width: 48%;"> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"A" document member of the same patent family</p> </div> </div>		
<b>IV. CERTIFICATION</b>		
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1                      25 SEPTEMBER 1991	08 OCT 1991	
International Searching Authority	Signature of Authorized Officer	
EUR PEAN PATENT OFFICE	FRIDEN C.M. <i>C. Friden</i>	

## III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)

Category °	Citation of Document, with indication, where appropriate, of the relevant passages	Relevant to Claim No.
A	N.T.I.S. TECH NOTES no. 4G, April 1985, SPRINGFIELD, VA, USA RIVIN: 'Bonded Lockstitch for Insulating Blankets '	
A	US,A,4 460 645 (JONES) July 17, 1984 ---	



**ANNEX TO THE INTERNATIONAL SEARCH REPORT  
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GB 9100773  
SA 47701

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report. The members are as contained in the European Patent Office EDP file on  
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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP-A-0328293	16-08-89	US-A- 4929429 AU-A- 2771889 JP-A- 1240715 US-A- 5028397	29-05-90 17-08-89 26-09-89 02-07-91
GB-A-2171180	20-08-86	EP-A- 0192417	27-08-86
US-A-2520914		None	
US-A-4144627	20-03-79	JP-C- 1184226 JP-A- 51119421 JP-B- 58017335	27-12-83 20-10-76 06-04-83
US-A-4460645	17-07-84	None	

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